

# SEQUENCE LISTING

<110> Levy, Ilan

Shoseyov, Oded

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<120> MODIFICATION OF POLYSACCHARIDE CONTAINING MATERIALS

<130> 01/22952

<160> 13

<170> PatentIn version 3.1

<210> 1

<211> 507

<212> DNA

<213> Clostridium cellulovorans

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caaacttcgt taaagaaaca gcaagcccaa catcaaccta tgatacatat gttgaatttg	300
gatttgcaag cggacgagct actcttaaaa aaggacaatt tataactatt caaggaagaa	360
taacaaaatc agactggtca aactacactc aaacaaatga ctattcattt gatgcaagta	420
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<213> Clostridium cellulovorans

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Ser Ala Gln Thr Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr  
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Ser Asp Ser Asp Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr  
35 40 45

Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala Gly  
50 55 60

Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr Ala  
65 70 75 80

Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr  
85 90 95

Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln  
100 105 110

Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr  
 115 120 125

Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro Val  
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Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly  
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Thr Ala Pro

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<213> Clostridium cellulovorans

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attattacac aagtgatggt acacaaggac aaactttctg gtgtgaccat gctggtgcat 180

tattaggaaa tagctatggt gataacacta gcaaagtgac agcaaacttc gttaaagaaa 240

cagcaagccc aacatcaacc tatgatacat atgttgaatt tggatttgca agcggacgag 300

ctactcttaa aaaaggacaa tttataacta ttcaaggaag aataacaaaa tcagactggt 360

caaactacac tcaaacaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa 420  
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<213> Clostridium cellulovorans

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Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn  
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Leu Asn Asp Val Lys Val Arg Tyr Tyr Thr Ser Asp Gly Thr Gln  
 35 40 45

Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser  
 50 55 60

Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr  
 65 70 75 80

Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala  
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Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly  
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Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr  
                     115                    120                    125

Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr  
                     130                    135                    140

Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly Pro Asp  
 145                    150                    155                    160

Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp Pro Gly  
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tattaggaaa tagctatggt gataacacta gcaaagtac agcaaacttc gttaaagaaa	240
cagcaagccc aacatcaacc tatgatacat atgttgaatt tggatttgca agcggacgag	300
ctactcttaa aaaaggacaa ttataacta ttcaaggaag aataacaaaa tcagactggt	360
caaaactacac tcaaacaat gactattcat ttgatgcaag tagttcaaca ccagttgtaa	420
atccaaaagt tacaggatat ataggtggag ctaaagtact tggtagca ccaggtccag	480
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cgacatcatc aatgtcagtt gaattttaca actctaaca atcagcaca acaaactcaa	600
ttacaccaat aatcaaaatt actaacacat ctgacagtga tttaaattta aatgacgtaa	660
aagttagata ttattacaca agtgatggt cacaaggaca aactttctgg tgtgaccatg	720
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cagactggtc aaactacact caaacaatg actattcatt tgatgcaagt agttcaacac	960
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<213> Clostridium cellulovorans

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Leu Asn Asp Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln  
35 40 45

Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser  
50 55 60

Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr  
65 70 75 80

Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala  
85 90 95

Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly  
100 105 110

Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr  
115 120 125

Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys Val Thr  
 130 135 140

Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly Pro Asp  
 145 150 155 160

Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp Pro Gly  
 165 170 175

Thr Met Ala Ala Thr Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn  
 180 185 190

Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn  
 195 200 205

Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr  
 210 215 220

Tyr Thr Ser Asp Gly Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala  
 225 230 235 240

Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr  
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Ala Asn Phe Val Lys Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr  
 260 265 270

Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly  
275 280 285

Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn  
290 295 300

Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro  
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Val Val Asn Pro Lys Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu  
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Gly Thr Ala Pro  
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<223> Recombinant protein sequence

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<221> misc\_feature

<222> (3)..(791)

<223> Taken pRIT2T cloning vector

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&lt;221&gt; misc\_feature

&lt;222&gt; (795)..(1280)

&lt;223&gt; Taken from cbpA gene

&lt;400&gt; 7

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actctcaagc tccaaaagct gatgcgcaac aaaataactt caacaaagat caacaaagcg      180

ccttctatga aatcttgaac atgcctaact taaacgaagc gcaacgtaac ggcttcattc      240

aaagtcttaa agacgaccca agccaaagca ctaacgtttt aggtgaagct aaaaaattaa      300

acgaatctca agcaccgaaa gctgataaca atttcaacaa agaacaacaa aatgctttct      360

atgaaatctt gaatatgcct aacttaaagc aagaacaacg caatggtttc atccaaagct      420

taaaagatga cccaagccaa agtgctaacc tattgtcaga agctaaaaag ttaaatgaat      480

ctcaagcacc gaaagcggat aacaaattca acaaagaaca acaaaatgct ttctatgaaa      540

tcttacattt acctaactta aacgaagaac aacgcaatgg tttcatccaa agcctaaaag      600

atgaccaag ccaaagcgct aaccttttag cagaagctaa aaagctaaat gatgctcaag      660

caccaaaagc tgacaacaaa ttcaacaaag aacaacaaaa tgctttctat gaaattttac      720

atttacctaa cttaactgaa gaacaacgta acggcttcat ccaaagcctt aaagacgac      780

cggggaattc catggcagcg acatcatcaa tgtcagttga attttacaac tctaacaat      840

cagcacaac aaactcaatt acaccaataa tcaaaattac taacacatct gacagtgatt      900

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 aagtgcacgc aaacttcggt aaagaaacag caagcccaac atcaacctat gatacatatg 1080  
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<223> Protein A sequence, from cloning vector

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Gly Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala

35 40 45

Gln Gln Asn Asn Phe Asn Lys Asp Gln Gln Ser Ala Phe Tyr Glu Ile

50 55 60

Leu Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln

65 70 75 80

Ser Leu Lys Asp Asp Pro Ser Gln Ser Thr Asn Val Leu Gly Glu Ala

85 90 95

Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn

100 105 110

Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu

115 120 125

Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro

130 135 140

Ser Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser  
 145 150 155 160

Gln Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala  
 165 170 175

Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn  
 180 185 190

Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu  
 195 200 205

Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp  
 210 215 220

Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His  
 225 230 235 240

Leu Pro Asn Leu Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu  
 245 250 255

Lys Asp Asp Pro Gly Asn Ser Met Ala Ala Thr Ser Ser Met Ser Val  
 260 265 270

Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr Asn Ser Ile Thr Pro  
 275 280 285

Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp Leu Asn Leu Asn Asp  
 290 295 300

Val Lys Val Arg Tyr Tyr Tyr Thr Ser Asp Gly Thr Gln Gly Gln Thr  
 305 310 315 320

Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly Asn Ser Tyr Val Asp  
 325 330 335

Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys Glu Thr Ala Ser Pro  
 340 345 350

Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly Phe Ala Ser Gly Arg  
 355 360 365

Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile Gln Gly Arg Ile Thr  
 370 375 380

Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn Asp Tyr Ser Phe Asp  
 385 390 395 400

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Gly Gly Ala Lys Val Leu Gly Thr Ala Pro  
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 <222> (652)..(981)  
 <223> Taken from bovine

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 aactctaaca aatcagcaca aacaaactca attacaccaa taatcaaaat tactaacaca 180  
 tctgacagtg atttaaattt aaatgacgta aaagttagat attattacac aagtgatggt 240  
 acacaaggac aaactttctg gtgtgaccat gctggtgcat tattaggaaa tagctatggt 300  
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<223> Taken from Clostridium cellulovorans

&lt;220&gt;

&lt;221&gt; misc\_feature

&lt;222&gt; (226)..(326)

&lt;223&gt; Taken from bovine

&lt;400&gt; 10

His Met Lys Glu Thr Ala Ala Ala Lys Phe Glu Arg Gln His Met Asp

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Ser Pro Asp Leu Gly Thr Leu Val Pro Arg Gly Ser Met Ala Ala Thr

20 25 30

Ser Ser Met Ser Val Glu Phe Tyr Asn Ser Asn Lys Ser Ala Gln Thr

35 40 45

Asn Ser Ile Thr Pro Ile Ile Lys Ile Thr Asn Thr Ser Asp Ser Asp

50 55 60

Leu Asn Leu Asn Asp Val Lys Val Arg Tyr Tyr Thr Ser Asp Gly

65 70 75 80

Thr Gln Gly Gln Thr Phe Trp Cys Asp His Ala Gly Ala Leu Leu Gly

85 90 95

Asn Ser Tyr Val Asp Asn Thr Ser Lys Val Thr Ala Asn Phe Val Lys

100 105 110

Glu Thr Ala Ser Pro Thr Ser Thr Tyr Asp Thr Tyr Val Glu Phe Gly  
115 120 125

Phe Ala Ser Gly Arg Ala Thr Leu Lys Lys Gly Gln Phe Ile Thr Ile  
130 135 140

Gln Gly Arg Ile Thr Lys Ser Asp Trp Ser Asn Tyr Thr Gln Thr Asn  
145 150 155 160

Asp Tyr Ser Phe Asp Ala Ser Ser Ser Thr Pro Val Val Asn Pro Lys  
165 170 175

Val Thr Gly Tyr Ile Gly Gly Ala Lys Val Leu Gly Thr Ala Pro Gly  
180 185 190

Pro Asp Val Pro Ser Ser Ile Ile Asn Pro Thr Ser Ala Thr Phe Asp  
195 200 205

Pro Gly Thr Met Gly Pro Pro Pro Gly Ser Thr Ser Ala Ala Ser Ser  
210 215 220

Ser Asn Tyr Cys Asn Gln Met Met Lys Ser Arg Asn Leu Thr Lys Asp  
225 230 235 240

Arg Cys Lys Pro Val Asn Thr Phe Val His Glu Ser Leu Ala Asp Val  
245 250 255

Gln Ala Val Cys Ser Gln Lys Asn Val Ala Cys Lys Asn Gly Gln Thr  
 260 265 270

Asn Cys Tyr Gln Ser Tyr Ser Thr Met Ser Ile Thr Asp Cys Arg Glu  
 275 280 285

Thr Gly Ser Ser Lys Tyr Pro Asn Cys Ala Tyr Lys Thr Thr Gln Ala  
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Asn Lys His Ile Ile Val Ala Cys Glu Gly Asn Pro Tyr Val Pro Val  
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His Phe Asp Ala Ser Val  
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<212> DNA

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<223> single strand DNA oligonucleotide

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18

<210> 13

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<212> DNA

<213> Artificial sequence

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22